A Synopsis Report Submitted
On

Design, synthesis and molecular docking of novel five member thio and azo hetrocyclic ring analogues and their impact in biomedical application.

By

Nitin Kumar
(ROLL NO. 2165004003)

Under the Supervision of

Dr. Sachin Kumar
Professor

IIMT COLLEGE OF MEDICAL SCIENCES
MEERUT,
UTTAR PRADESH, INDIA

IIMT UNIVERSITY, MEERUT
UTTAR PRADESH, INDIA

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DECLARATION

I hereby declare that this synopsis report submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgment has been made in the text.

Nitin Kumar
Roll No. 2165004003

Dr. Mojahid Ul Islam
Dean,
IIMT College of Medical Sciences,
Sciences,

Dr. Sachin Kumar,
Professor,
IIMT College of Medical
(Guide)

Date: 30/05/2022
Place: Meerut

INTRODUCTION

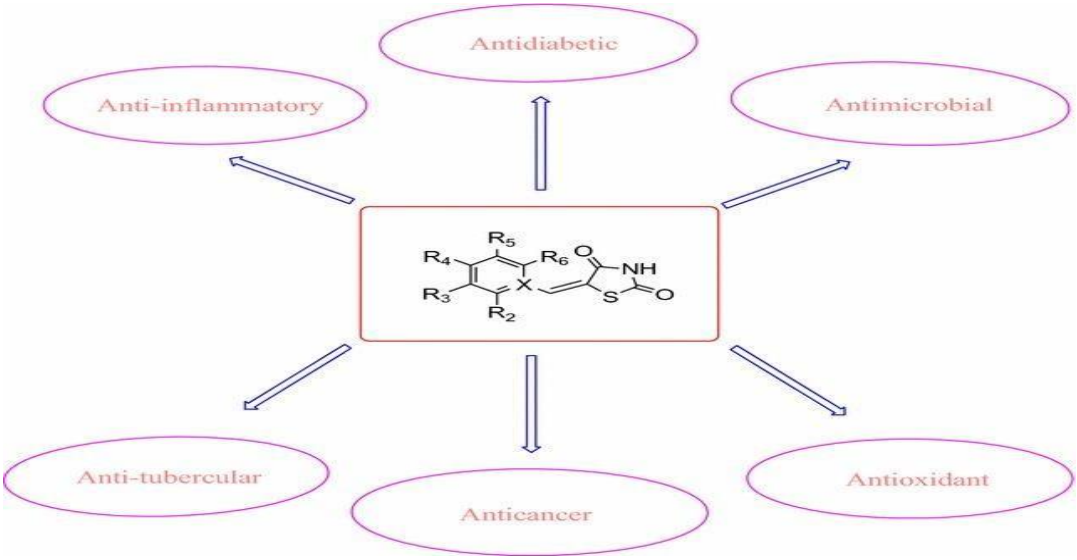
The heterocyclic chemical compound thiazolidine has the formula (CH2)3(NH) S. It is a five-membered saturated ring having amine and thioether groups in the first and third positions. It is an oxazolidine analogue with sulphur. A clear liquid, thiazolidine has no colour. Thiazolidines, derivatives, are well-known. For instance, the medication pioglitazone has a thiazolidine ring in it. The antibiotic penicillin also has a thiazolidine ring in it.

thiazolidine moiety use In many different forms, thiazolidine can be found all over the natural world. Many biological substances, like as negetive-hyperglycemic, negetive-carcinogenic, negative-malarial, negative-microbial, against-mycobacterium, against viral, against-HIV, against-inflammatory, & antioxidant medicines, include the thiazolidine nucleus. [1]

In a wide variety of malignancies, thiazolidine-2,4-diones have been reported to have reducing cancer cells benefits. PPAR (PPAR-gamma) activators called TZDs are used to treat type 2 diabetes. PPAR gamma ligands (TZDs) have recently been shown to have anticarcinoma effects by interfering with cell division, and proliferation. They have also been shown to reduce tumour angiogenesis. The antiangiogenic effect of TZDs is due to its suppression action on vascular endothelial growth factor production and inhibition of endothelial cell proliferation. Since it is believed that PPAR activation is the mechanism by which TZDs exert their anticancer action, They have undergone scientific trials against malignancies of humans that exhibit high levels of PPAR. [2] [3]

Both cancerous and healthy mammary epithelial cells express. In vitro and in animals used in experiments, TZDs reduced the growth of breast cancer. Conjugated linoleic acid activation of PPAR- also inhibits cell proliferation in MCF7 breast cancer. Furthermore, the overwhelming documentation from research

examining the effectiveness of TZDs in treating breast carcinoma points to both in vivo and in vitro apoptosis induction and PPAR-ligands work to suppress angiogenesis, proliferation, and invasion. The TZD pioglitazone (II) reduced cell proliferation in colon cancer in a dose-dependent way [4].



From the newly synthesised 5-(substituted benzaldehyde) thiazolidine-2,4-dione derivatives' antimicrorganism, antidiabetic, & antioxidant action, the consequent SAR can be deduced. The existence of an electron-donor group (3,4,5-trimethoxy, p/o-OCH3) on the benzylidene part of the thiazolidinedione enhanced the antimicrobial activity of the synthesised compounds against S. typhi, C. albicans, A. niger, K. pneumonia, and anti-diabetic action, respectively. [5]

LITERATURE REVIEW

- **AbdelgawadMA et al. (2022)** Thiazolidine-2,4-diones 3-7a-c were synthesised and tested for anticancer activity against three cancer lines. They were more effective against HepG2 than the other HCT116 and MCF-7 tumour cell lines..[6]
- **Khaled EA et al. (2021)** Novel thiazolidine 2,4 diones were tested for their anticancer effects on MCF7 cells. HCT 116 was the cancer cell line that responded to the novel compounds' cytotoxic effects the greatest out of all the cancer cell lines evaluated. With IC50 values ranging from 38.76 to 53.99 M, compounds 18, 11, and 10 in particular were discovered to be the most effective derivatives tested against the HepG2, HCT-116, and MCF-7 cancer cell lines. To assess their inhibitory potentials against VEGFR2, the most powerful antiproliferative compounds (7-14 and 15-19) were submitted to further biological tests. With IC50 values ranging from 0.26 to 0.72 M, the investigated drugs showed excellent to moderate inhibitory efficacy. Compounds 18, 11, and 10 were very effective in inhibiting VEGFR2 at IC50 values [7]

- **Naim J et al. (2021)** 2,4-thiazolidinedione compounds with benzene sulphonyl groups were designed, synthesised, and docked against the (PPAR) . When compared to the usual medications pioglitazone and rosiglitazone, compound 7p was the most effective in decreasing blood glucose levels. [8]

- **Long, Nathan et al. (2021)** 2,4-Thiazolidinedione (TZD) has been researched as a preferred and widely used scaffold for the production of pharmaceutically active molecules. This heterocycle containing sulphur is a flexible pharmacophore with a wide variety of pharmacological actions. TZD has been proven to have biological activity against a diverse set of targets of interest to medicinal chemists. [9]

Aim & Objectives

1. Design, Synthesis and molecular docking of novel thiazolidine analogues and their impact in biomedical application.
2. The proposed work is used to create analogues that show maximum recptor binding by using docking techniques.
3. An appropriate analytical method is required to study the therapeutic and toxicological effects of new chemical synthesized anlogues.
4. Development of novel approach for synthesis of thiazolidine analogues.

5. The main objective of the proposed work to emphasize the biomedical application thiazolidine analogues such as anti-cancer activity, antiviral activity (covid19) and antimicrobial and antiprotozoal activity.

Plan of Work

- Exhaustive literature review

- Finding out novel analogues of thiazolidine by chem.-spider software

- Suitable analogues tested for receptor activity by docking technique by auto - dock software
- Development of synthesis scheme

- Structure elucidation of synthesized compounds by

    - I.R

    - MASS

    - NMR

    - U.V

- Toxicological study

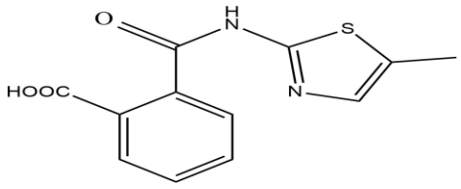
- Determination of biomedical application

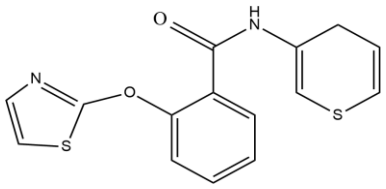
- Compilation of proposed research work

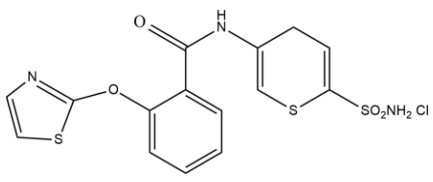
Methodology

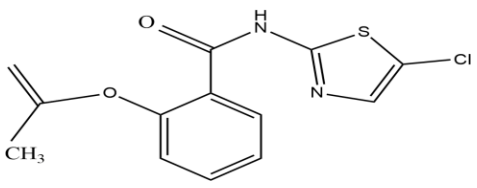
- Identify the different analogues of thiazolidine by using chemDraw and chemSpider software on the basis of 0Et value those compound shows positive result in chemspider (on the basis of 0Et) those screened analogues are further move to next step that is molecular docking for the receptor binding by auto dock software.
- Next step development of scheme of various thiazolidine analogues that are screened out from the docking process those synthesized analogues are conformed by structure elucidation technique such as I.R, N.M.R, MASS & U.V
- Next step for toxicological studies of synthesized analogues

- Finally screened out analogues are used for enhancement of biomedical application such as anti-cancer activity by cell-lining study, antimicrobial activity, antiviral activity and antidiabetic activity.









Conclusion

From the above proposed work, we conclude that the future development of Design, Synthesis and molecular docking of novel thiazolidine analogues and their impact in biomedical application. The proposed work is used to create analogues that show maximum receptor binding could be an innovative and useful step for the various treatment and infections. and safety profile of a new moiety. So the proposed work could produce a validated chemical compound with minimal toxic effects

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